Sales of Fuel Oil and Kerosene in 2008

In 2008, overall sales of fuel oil and kerosene fell sharply from 74.4 billion gallons to 67.2 billion gallons. The drop of 7.2 billion gallons (9.6 percent) from the level set in 2007 is the largest drop in combined sales on record and the lowest combined total since 1995. Distillate sales decreased by nearly 4.5 billion gallons, slipping to 58.7 billion gallons, the lowest total since 1999. Residual fuel oil sales fell by more than 2.4 billion gallons below the level attained in 2007 to 8.3 billion gallons. Kerosene sales also fell sharply, falling 55.6 percent to 218.7 million gallons, the lowest level in more than 25 years.

In 2008, sales of residual fuel oil accounted for 12.3 percent of total fuel oil and kerosene sales, the lowest share of the total since EIA began publishing data. The large drop in sales of residual fuel oil and kerosene, resulted in distillate fuel oil sales accounting for 87.4 percent of total sales, exceeding the previous highest share of total sales set in 2007, when distillate sales accounted for 84.9 percent of total fuel oil and kerosene sales. Sales of kerosene made up just 0.3 percent of total sales, compared to 0.7 percent in 2007.[1]

Distillate Fuel Oil

In 2008, distillate sales fell nearly 4.5 billion gallons countering the long-term trend of rising sales that has occurred in 12 of the past 16 years. The drop in sales during 2008 exceeded the magnitude of any previous decline in sales during that time frame.[2] Despite the size of the overall drop in distillate sales in 2008, sales to the farm sector and for direct use by oil companies increased somewhat, while sales to all other sectors fell in comparison to the previous year.

Although the transportation sector continued to dominate distillate sales, sales dropped throughout the sector. Overall sales to the transportation sector slipped by 3.4 billion gallons, nearly 1.8 billion

Table HL1. Volume Distribution of Distillate and Residual Fuel Oils, 2007 and 2008

Energy Use	2008 Distillate		2007 Distillate		2008 Residual		2007 Residual	
	Volume (million gallons)	Percent Share	Volume (million gallons)	Percent Share	Volume (million gallons)	Percent Share	Volume (million gallons)	Percent Share
Residential.................	4,631	7.9	5,142	8.1	—	—	—	—
Commercial................	2.572	4.4	2,719	4.3	403	4.9	481	4.5
Industrial....................	2.366	4.0	2,467	3.9	1,034	12.5	1,187	11.1
Oil Company..............	990	1.7	775	1.2	58	0.7	44	0.4
Farm...........................	3,212	5.5	3,203	5.1	—	—	—	—
Electric Power............	544	0.9	670	1.1	1,699	20.5	2,647	24.7
Railroad.....................	2,697	4.6	3,635	5.8	—	—	—	—
Vessel Bunkering…….	1,187	2.0	1,924	3.0	5,066	61.2	6,327	59.1
On-Highway...............	38,007	64.7	39,802	63.0	—	—	—	—
Military.......................	260	0.4	363	0.6	9	0.1	18	0.2
Off-Highway...............	2,272	3.9	2,512	4.0	—	—	—	—
Other.........................	0	0.0	0	0.0	4	0.1	3	0.0
Total..........................	58,739		63,211		8,273		10,706	

Notes: Totals may not equal sum of components due to independent rounding.
Sources: Energy Information Administration Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report," for 2004-2008. On-Highway Diesel data are Federal Highway Administration statistics of highway special fuels use.

[1] Numbers may not sum to 100 percent due to rounding.
[2] During the period 1991-2008, the average increase was 1.8 billion gallons while the largest previous drop was the 1.6 billion gallons that occurred in 2004.

gallons of the drop was on-highway fuel, but sales to the railroad and bunker sectors also fell sharply (down 938 million and 737 million gallons respectively).

The precipitous drop in sales came about as the result of a number of factors, particularly sharply rising energy prices during the first half of the year and deteriorating economic conditions that surfaced during the second half of the year. Economic conditions as measured by Gross Domestic Product (GDP) grew at a rate of 1.1 percent[3], half the rate of 2007. However, that overall growth masks the severe economic downturn particularly during the fourth quarter of the year. Spending on new residential construction dropped by nearly 35 percent, as a result, total spending for private construction went down by 9.8 percent. Capacity utilization rates for both the industrial and manufacturing sectors declined for the first time since 2002, by 0.4 percent and 0.5 percent respectively. Although total industrial production rose compared to 2007, the increase of 1.5 percent was the smallest increase since 2003[4]. The unemployment rate increased from 4.6 percent to 5.8 percent, the highest rate since 2003.[5]

Although weather always plays an important role in shaping demand for distillate fuel, 2008 was not a year with dramatic differences from normal conditions. The winter was cooler than in 2007 but only very slightly cooler than normal. While colder winter weather tends to boosts sales to the residential home heating market, particularly in the New England and the Middle Atlantic regions of the East Coast, where heating oil sales are concentrated,[6] record high prices and adverse economic conditions contributed to a drop in the principal consuming regions. Distillate sales to the residential sector fell by more than 430 million gallons in the northeast compared to a gain there of more than 215 million gallons the year before.

Another factor negatively impacting distillate sales was the fact that the summer of 2008 was cooler than the year before, resulting in a reduction in the need for electric utilities to consume distillate fuel to meet peak summer generation loads. Sales to utilities at the national level fell approximately 125.7 million gallons (18.8 percent).

Weather plays a major role in the agricultural sector and in 2008, at the national level the farm sector was one of only two market sectors to register a gain in distillate sales compared to the previous year. The growth at the national level was minimal; sales increased just 9.5 million gallons reflecting both the economic situation and such weather events at the regional level as drought, flooding, cold weather, tropical storms and hurricanes. Sales increased in the New England and Middle Atlantic portions of PAD District 1 (the East Coast), and in PAD District 2 (the Midwest farm belt) and District 5 (the West Coast). However, sales declined in the southern portion of PAD District 1, which includes Florida, dropping 13.4 million gallons. In the Midwest sales increased slightly moving up by less than two million gallons (only one tenth of a percent). Sales along the Gulf Coast fell the most of any region, dropping more than 25 million gallons. In the Rocky Mountains, sales also fell by more than 20 million gallons. On the West Coast, sales jumped, growing by 58.5 million gallons, an increase of 15.3 percent.

Among the leading crops, the harvests of soybeans and wheat increased while corn and cotton production were lower than in 2007. Despite a drop of some seven percent in corn production, the harvest was still the second highest on record, bolstered in part by the requirement to add ethanol to gasoline.[7]

Aided by less severe weather conditions and especially by record high prices during the first half of the year, distillate sales for oil company use surged. In 2008, weather did not play a major role in influencing oil company use despite the fact that there was a very active tropical cyclone season including for the first time, six consecutive tropical cyclones to make landfall on the U.S. mainland during the year. Unlike 2005 when Hurricanes

[3] GDP is a prime measure of the state of the economy as measured in constant (inflation adjusted) dollars.
[4] Total industrial production includes manufacturing of both durable and nondurable goods, mining and utilities.
[5] *Economic Indicators,* May 2009, p 12. (Note, data apply to persons age 16 and over.)
[6] The U.S. is divided into 5 Petroleum Administration for Defense Districts (PADD). PADD 1, East Coast, PADD 2, Midwest, PADD 3, Gulf Coast, PADD 4, Rocky Mountain, and PADD 5, West Coast. PADD 1 is broken into three subdistricts PADD 1A, New England, PADD 1B, Central Atlantic, and PADD 1C, Lower Atlantic.
[7] Department of Agriculture, National Agricultural Statistics Service, *Crop Production 2008 Summary,* January 2009, page 77.

Katrina and Rita sharply impacted oil company demand, damage from Hurricanes Gustav and Ike and other tropical storms while significant, did not have the devastating impact of the earlier storms on the industry.

In addition, for the second year in a row, higher energy prices spurred exploration and development activities increasing sales nationally by more than 20 percent. The number of drilling rigs in operation, an important measure of oil company activity, increased by 6.6 percent compared to 2007[8]. The number of working rigs increased each month until December when the number dipped slightly reflecting changing economic conditions and lower prices for oil and petroleum products. Although distillate sales to oil companies jumped by nearly 28 percent, not all regions experienced gains. Sales dropped slightly on the East Coast and were essentially unchanged on the West Coast. However, spurred by both high prices and particularly by discoveries and developments in areas rich in shale deposits, sales to the sector increased sharply. Sales to oil companies shot up by 20.6 percent (35.0 million gallons) in the Rocky Mountains and by 39.4 percent (157 million gallons) on the Gulf Coast.

For the first time since 2004, sales of distillate fuel to the transportation sector fell, dropping in the aggregate by 3.4 billion gallons. Nearly 1.8 billion gallons of that drop resulted from reduced demand from the on-highway sector. Sales of on-highway diesel fell in all regions of the country. Sales of distillate fuel for use by railroads also fell in every region. At the national level, sales to railroads fell by nearly 29 percent, dropping 938 million gallons, compared to a gain of 22 million gallons in 2007. With the exception of the Middle Atlantic portion of the East Coast, sales of bunker marine fuel, the final component of transportation sales, also fell, dropping more than 38 percent (737 million gallons).

In 2008, sales to the off-highway sector dropped by 240 million gallons, down approximately 9.6 percent. While the drop reflects the downturn in the economy, it also reflects increased volatility in this market segment. Sales in 2007 increased by approximately 34 million gallons plunged by 477 million in 2006, and increased by 209 million gallons in 2005, accounting for nearly 25 percent of the overall increase in distillate sales that year.

Nationally, sales to the commercial sector fell in most regions of the country dropping 146.4 million gallons (5.4 percent). Sales dropped in all three sub-regions of the East Coast, falling 241 million gallons (13.4 percent). Sales also fell along the Gulf Coast down 32.6 million gallons (13.8 percent). In the Rocky Mountains, sales were flat slipping just 32 thousand gallons. Not all regions lost sales; in the Midwest and on the Pacific Coast sales increased, moving up 42 million gallons (10.3 percent) and 84.8 million gallons (38.8 percent) respectively. The drop in sales in the prime consuming region of the Northeast resulted from both a warmer winter than was the case in 2007 and from high prices. Prices rose rapidly during much of the first half of the year culminating in record high prices in July. Not only did commercial demand fall as a result of conservation efforts driven by the cost of fuel, but there are anecdotal reports of fuel switching (primarily to natural gas) as well.

Nationally, sales to the industrial sector fell 4.1 percent (100.7 million gallons) reflecting a drop in industrial production of 2.25 percent and in industrial utilization of 3.72 percent[9]. Regionally, sales of distillate fuel oil to the industrial sector fell on the East Coast and in the Midwest, dropping 73.0 million gallons (8.6 percent) and 86.0 million gallons (13.0 percent) respectively, while sales increased somewhat in the Rocky Mountains, on the Gulf Coast and the West Coast. Sales grew the most on the West Coast where they were up 47.7 million gallons (13.2 percent).

Dropping 103.0 million gallons (28.4 percent), distillate sales to the military fell for the first time since 2005. On a regional basis, sales fell in the Midwest, Gulf Coast, Rocky Mountains and the Middle Atlantic portion of the East Coast. The largest declines took place in the Middle Atlantic, a drop of 8.6 million gallons, on the Gulf Coast where sales fell 8.1 million gallons and on the Pacific Coast where sales dropped 92.2 million gallons (38.3 percent).

[8] Hughes Christensen, Rotary Rigs Running by State 2008, Monthly Averages, http://files.shareholder.com/downloads/BHI/459516224x0x263536/5D053E44-3A69-4F8D-96F3-8BBC65191581/U.S._Annual_Averages_by_State_1987_-_2008_weekly_revised.xls
[9] EIA, *Monthly Energy Review*, May 2009, Table 2.1.

Residual Fuel Oil

Reflecting both the long term trend of declining sales of residual fuel oil and the adverse economic conditions that affected sales of petroleum products in general during 2008, overall sales of residual fuel fell by 22.7 percent (2.4 billion gallons). Sales fell to all market segments with the exception of oil company use and the miscellaneous "other" category. Reflecting the volatility of the residual fuel oil market, by far the largest drops in sales were in the bunker and electric utility sectors, while in 2007, the sales increases were concentrated in those two sectors.

Sales of bunker fuel continued to represent the largest share of the residual fuel oil sales market (61.2 percent). The drop in sales of bunker fuel in 2008 exceeded the falloff in sales to all other market segments combined accounting for 52 percent of the total drop in sales (1.26 billion gallons). The next largest decrease was 948 million gallons to the electric utility market. There were also sizeable drops in sales to the commercial and industrial sectors down (77.7 million gallons and 153.4 million gallons respectively).

Over the past decade, overall sales of residual fuel oil have fallen by more than 40 percent. However, despite the downward trend, the period has been characterized by extreme volatility with precipitous swings in the volume of sales, particularly with respect to the electric utility sector. Beginning in 1998, annual sales to the electric power sector have fallen by at least one billion gallons three times but have increased by at least one billion gallons four times. Sales fell by 1.4 billion gallons in 1999, 2.1 billion gallons in 2002, and 3.3 billion gallons in 2006. Sales increased by 1.8 billion gallons in 1998, 1.3 billion gallons in 2001, 1.7 billion gallons in 2003, and 1.1 billion gallons in 2005.

The high degree of volatility is a reflection of changes in the electric power sector, weather conditions, the pricing structure of residual fuel oil and competing fuels, as well as other factors affecting the production and sales of residual fuel in general.

In 2005, prompted in part, by the high price of natural gas, and by constrained natural gas availability following the hurricane related damage to production and distribution facilities, there is evidence that concern over the supply of natural gas led to an increased use of oil and less emphasis on natural gas in at least one region of the country.[10]

However, in 2006, while the price of residual fuel to the electric power sector increased by 12.9 percent the price of natural gas to the sector fell by 15.7 percent.[11] Consequently, rising oil prices coupled with lower prices for a major competing fuel and the warmer than normal winter contributed to the very large drop of 3.3 billion gallons that year.

In 2007, the cool winter early in the year, helped boost sales and offset at least in part the rising fuel oil prices, particularly in November and December. In addition, the price of residual fuel used by electric utilities in 2007 increased by 7.9 percent on an annual basis, while the price of natural gas went up only by 2.3 percent. This compares to the situation in 2006, when residual fuel oil increased by 11.2 percent and natural gas prices dropped by 15.5 percent compared to 2005.[12] Consequently, sales to the electric power sector increased by 5.6 percent compared to a drop of 56.5 percent in 2006.

In 2008, the unprecedented spike in petroleum prices coupled with the rapid development of natural gas production from such shale deposits as Haynesville, Barnett, and Marcellus contributed to the drop in sales of nearly 36 percent. Consequently, total sales to the utility sector fell to less than 2 billion gallons for the first time.

Although the overall trend is down, the potential for some level of fluctuation in the amount of fuel sold remains possible whenever interruptible gas contracts take effect during the coldest winter periods and whenever price differentials make switching attractive. Fluctuations can occur either in the short-term or when prolonged higher prices of either residual fuel or natural gas make fuel switching attractive for the relative few with the ability to switch.

[10] In October 2005, ISO New England approved the 2005 Regional System Plan that among other provisions called for the diversification of the fuel mix for the region, including the conversion of more than 1,000 megawatts of gas-only fired generation to dual fuel capability by the winter of 2009-2010. See ISO New England, 2005 Regional System Plan, October 20, 2005.
[11] EIA, *Monthly Energy Review*, May 2009, Table 9.1.
[12] EIA, *Monthly Energy Review*, May 2009, Table 9.10.

Nonetheless, the principle reasons for the decline in sales of residual fuel oil remain, changing crude oil specifications and the enhanced refinery sophistication resulting in increased production of gasoline and distillate at the expense of heavier products such as residual fuel oil. In addition, environmental constraints and restrictions on fuel oil use, and the availability of abundant relatively inexpensive natural gas have contributed to a diminished use of residual fuel oil in general and its use in the production of electric power in particular.[13]

Kerosene

For the third year in a row, kerosene sales dropped sharply. Total sales of kerosene fell to 274 million gallons, plunging by 55.6 percent, following a drop of 330 million gallons in 2007 and a 247 million gallon loss in 2006. Kerosene sales have plunged by 80 percent since 2005 bringing them to the lowest total in more than 25 years. Sales of kerosene fell to all market segments with the largest drop occurring in the residential sector where sales fell by 167.6 million (51.5 percent).

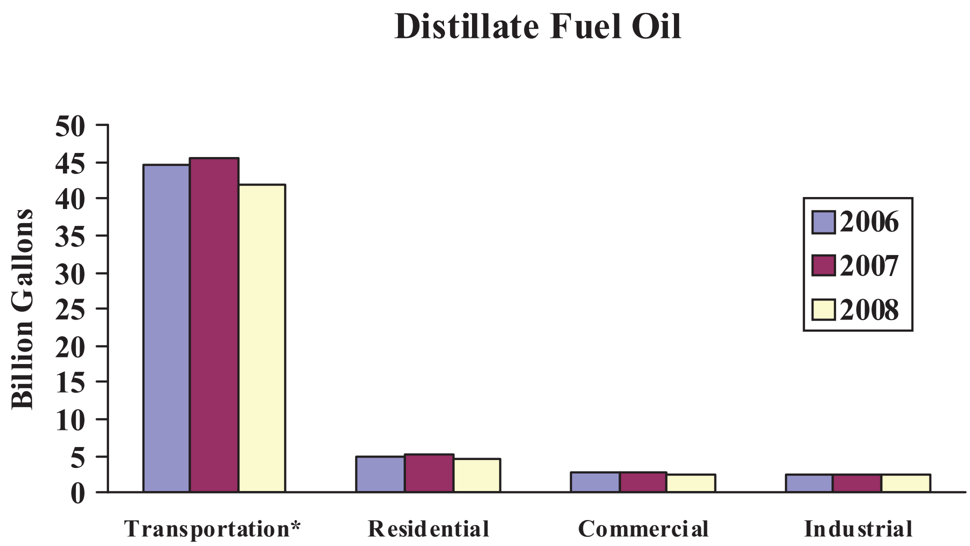
Sales to the residential sector fell without exception in all regions of the country with the largest declines occurring along the East Coast from New England to Florida. Although the largest drop took place in the Northeast where sales are concentrated, the falloff in sales was significant in all regions of the country. Anecdotal evidence suggests that the fuel switching to natural gas and to some extent, to propane was primarily responsible for the drop in sales.

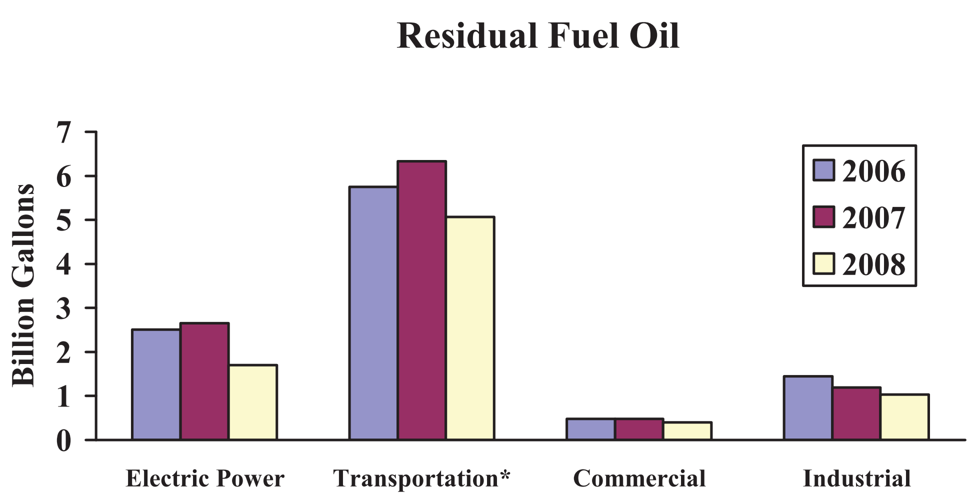
Sales to both the commercial and industrial sectors also fell in all regions of the country dropping by 36.3 million gallons (53.4 percent) and 65.2 million gallons (73.8 percent) respectively at the national level. In the commercial sector, the largest drop in sales occurred in the Central Atlantic, where sales went down by 59.4 percent (14.7 million gallons). Industrial sales dropped the most on the Gulf Coast where sales plunged 36.7 million gallons (86 percent).

Sales to the farm sector also fell in every region dropping by 45.8 percent nationally. The region with the largest drop in sales was the Midwest, where the principal farming states are located. Sales there fell by 2.4 million gallons (41 percent) and accounted for 55 percent of the drop in sales to the farm sector nationally.

[13]It should be noted that the ability to increase production of light higher value products does not typically mean that refineries with upgraded processing capacity no longer possess the ability to produce heavier products such as residual fuel; rather, the economics involved dictate the production of the higher value products. Due to the divestiture of many electric power generation facilities, changes in fuel use and plant operations also contributed to the decline of residual fuel oil. For example, operators of these merchant plants blend fuels to achieve greater efficiency and to lower emissions of dirtier fuels (oil blended with natural gas and even oil and coal). When it is advantageous, the operators also may purchase power rather than generate electricity and re-sell the fuel.

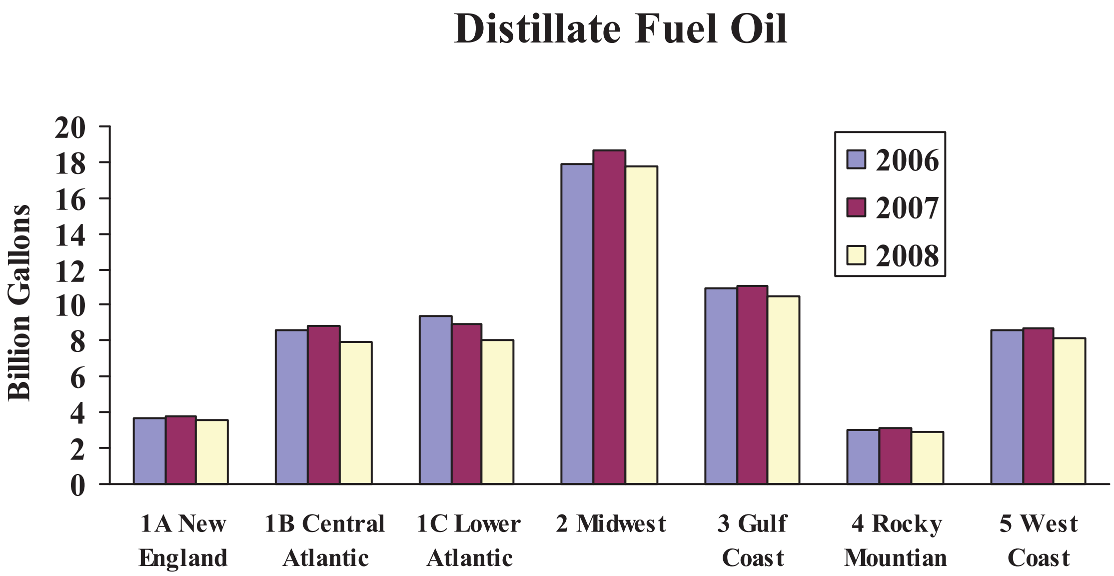
Figure HL1. U.S. Sales of Distillate and Residual Fuel Oils by Energy Use, 2006-2008

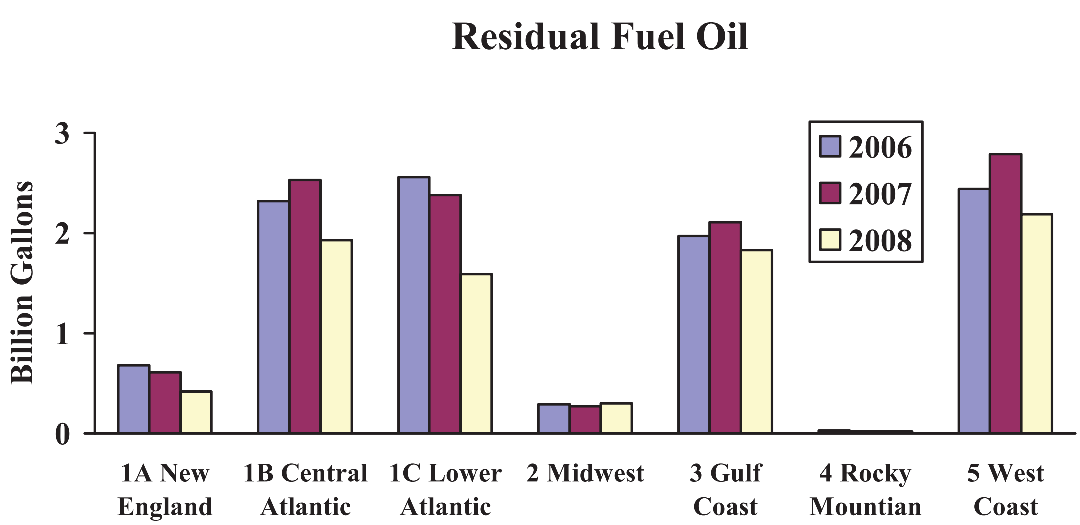




*For distillate fuel oil, transportation use comprises railroad, vessel bunkering, and on-highway diesel energy use categories. For residual fuel oil, transportation use comprises vessel bunkering energy use category.
Source: Energy Information Administration, Form EIA-821, "Fuel Oil and Kerosene Sales Report," 2007 and 2008.

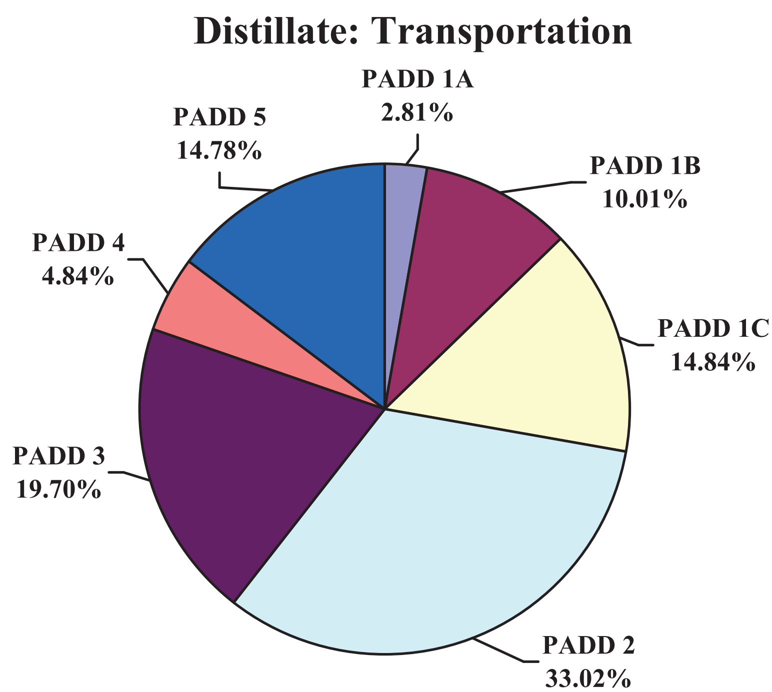
Figure HL2. Volume Distribution of Distillate and Residual Fuel Oils by PAD District, 2006-2008

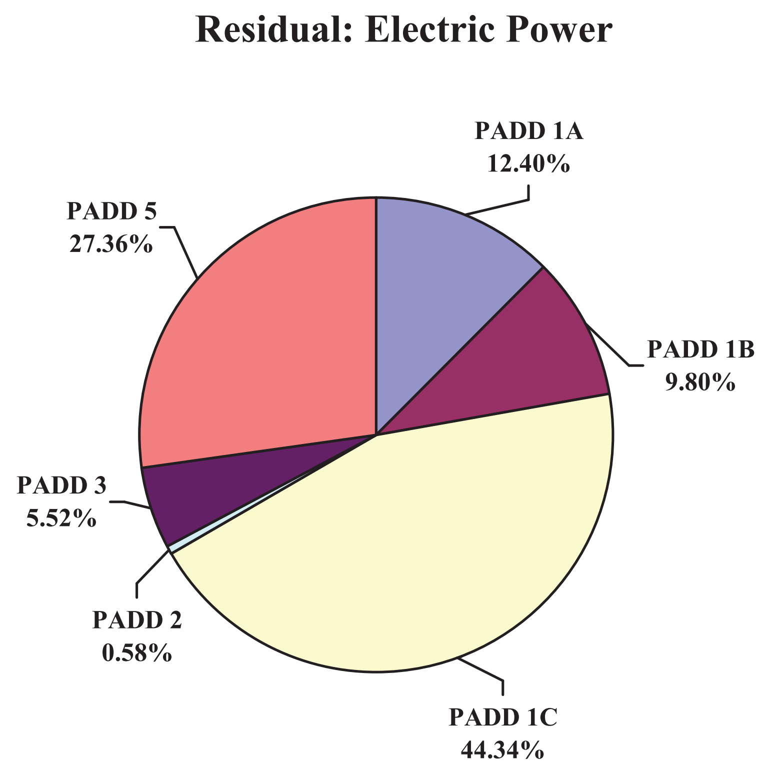




*Residual fuel oil sales in PAD District 4 are too small to appear in the graph.
Source: Energy Information Administration, Form EIA-821, "Fuel Oil and Kerosene Sales Report," 2007 and 2008.

Figure HL3. Distillate and Residual Fuel Oil Sales for Selected Energy Use Categories by PADD District, 2008





*Residual fuel oil sales in PAD District 4 are too small to appear in the graph.
Source: Energy Information Administration, Form EIA-821, "Fuel Oil and Kerosene Sales Report," 2008.